

## TWO NEW SPECIES OF THE GENUS *DIPTACUS* KEIFER (ERIOPHYOIDEA, DIPTILOMIOPIDAE, DIPTILOMIOPINAE) FROM SHAANXI PROVINCE, CHINA

XIE Man-Chao

*College of Agriculture and Life Science, Ankang University, Ankang 725000, China; E-mail: xiemancho@163.com*

**Abstract** Two new species, *Diptacus brevichaetus* sp. nov. on *Lindera glauca* (Sieb. et Zucc.) Bl. (Lauraceae) and *Diptacus shanzhou* sp. nov. on *Cerasus pseudocerasus* (Lindl.) G. Don (Rosaceae), are described and illustrated from Shaanxi Province, China. Type specimens are deposited in the College of Agriculture and Life Science, Ankang University, Ankang City, Shaanxi Province, China.

**Key words** Eriophyoid mites, new species, *Diptacus*, China.

The genus *Diptacus* (Diptilomiopidae, Diptilomiopinae) was established by Keifer in 1951, with the type species *Diptilomiopus sacramentae* Keifer, 1939, which is characterized by the following characters: body fusiform, gnathosoma large, chelicerae abruptly bent down; anterior shield lobe present; scapular tubercles set ahead of rear shield margin, scapular setae projecting up or ahead or centrad; coxae with three pairs of setiferous tubercles and setae; the legs lack the femoral setae; empodium divided; opisthosoma with slight subdorsal furrows and a weak ridges; all ventral setae present. As of 1994, 27 species were arranged into the genus, of which 8 species occurred in China (Amrine *et al.*, 1994). To date, 41 species have been reported in China (Hong, Xue *et al.*, 2010), of which 6 species distributed in Shaanxi Province (Song, Xue *et al.*, 2007; Xie, Hu *et al.*, 2012; Xue *et al.*, 2005; Xue, Song *et al.*, 2006).

From 2009 to 2011, we conducted a eriophyoid mites survey in the Mt. Qinling. As a result, two new species are described and illustrated herein.

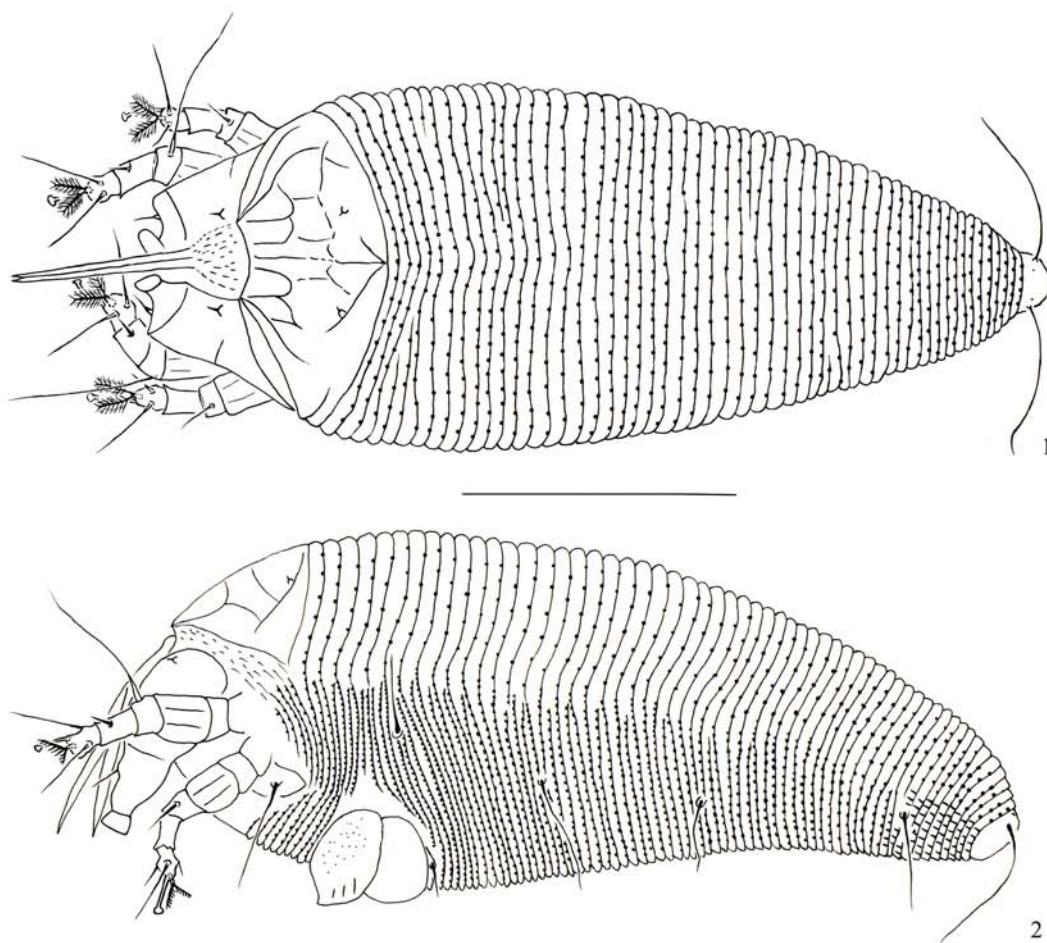
The methods of slides mounted and specimens measured keep to Kuang (1995). The morphological terminology and the generic classification follow Amrine *et al.* (2003). Type specimens were examined with an Olympus BX51 microscop, and digital images of specimens were captured from the microscope at the same time, based on which the drawings of the mites were made. All measurements are in micrometers ( $\mu\text{m}$ ) and are lengths when not specified, and the range of the paratypes (in brackets) follows the measurements of the holotype. Moreover, the numbers of scale bars in figures have been rounded up.

### *Diptacus brevichaetus* sp. nov. (Figs 1–6)

Female ( $n = 8$ ). Body fusiform, 203 (188–238), 97 (88–97) wide, 95 (83–95) thick; white in color. Gnathosoma 50 (48–50), chelicerae 50 (48–50), abruptly bent down; pedipalp coxal seta (*ep*) 3 (2–3), dorsal pedipalp genual seta (*d*) 9 (8–10). Prodorsal shield 40 (30–40), 70 (60–70) wide. Shield design with 4 networks on the front of shield; median line discontinuous at median, and connected with 2 oblique lines on rear shield margin; anterior shield lobe emarginate. Scapular tubercles set well ahead of shield margin, very small, 25 (23–25) apart; scapular setae (*sc*) minute, only 0.5–1.0. Coxal plates smooth, anterolateral setae on coxisternum I (1*b*) 10 (10–12), 16 (14–16) apart; proximal setae on coxisternum I (1*a*) 15 (15–18), 15 (13–15) apart; proximal setae on coxisternum II (2*a*) 50 (28–50), 37 (33–38) apart; prosternal apodeme absent. Legs segments normal, femoral setae absent from both legs; leg I 39 (38–42), femur 12 (12–13); genu 5 (5–6), antaxial genual seta (*l'*) 40 (37–40); tibia 10 (9–10), paraxial tibial seta (*l'*) 5 (5–8), located at 1/3 lateral from end; tarsus 7 (7–8), both seta *f'* and seta *f''* 20 (20–25), seta *u'* 5 (5–6); tarsal empodium (*em*) 6 (5–6), divided, 7 rayed; tarsal solenidion (*ω*) 7 (6–7), knobbed. Leg II 38 (37–41), femur 12 (12–13); genu 5 (5–6), antaxial genual seta (*l'*) 7 (7–9); tibia 9 (8–9); tarsus 7 (7–8), seta *f'* 7 (5–7), seta *f''* 20 (20–25), seta *u'* 5 (5–6); tarsal empodium (*em*) 6 (5–6), divided, 7 rayed; tarsal solenidion (*ω*) 7 (6–7), knobbed. Opisthosoma dorsally with 53 (52–57) broad annuli, with a weak median longitudinal ridges (about 10–14 dorsal annuli), and all dorsal annuli

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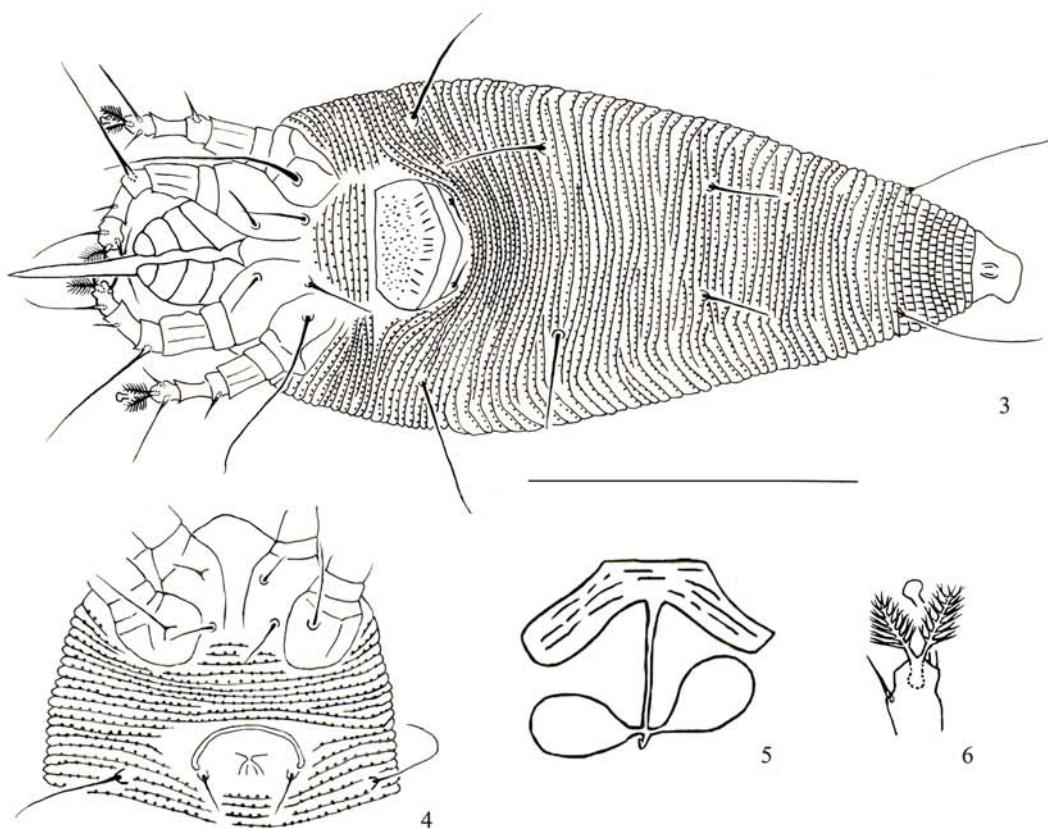
Figs 1–2. *Diptacus brevichaetus* sp. nov., female. 1. Dorsal view. 2. Lateral view. Scale bar = 72  $\mu\text{m}$ .

ornamented with small round microtubercles; ventrally with 79–83 annuli, with round microtubercles except caudal 10–11 ventral annuli with elongated microtubercles. Setae  $c$  2 30 (20–35) on ventral annulus 15–16, 69 (60–70) apart; setae  $d$  30 (30–68) on ventral annulus 32–33, 48 (43–49) apart; setae  $e$  18 (18–40) on ventral annulus 49–50, 28 (26–28) apart; setae  $f$  32 (25–40) on 10–11 ventral annulus from rear, 30 (28–30) apart. Setae  $h1$  minute, 8 (7–9) apart; setae  $h2$  40 (40–50), 12 (12–13) apart. Female genitalia 23 (23–25), 35 (32–35) wide, coverflap with basial granules and distal 12 short lines, setae  $3a$  8 (7–10), 23 (22–24) apart.

Male ( $n=5$ ). Body fusiform, 175–205, 81–85 wide, 80–90 thick. Gnathosoma 45–50, chelicerae 45–48; pedipalp coxal seta ( $ep$ ) 2–3, dorsal pedipalp genual seta ( $d$ ) 8–10. Prodorsal shield 35–38, 60–65 wide. Scapular tubercles set well ahead of shield margin, 23–25 apart; scapular setae ( $sc$ ) 0.5–1.0. Coxal plates smooth, anterolateral setae on coxisternum I (1b) 8–10, 13–14 apart; proximal setae on coxisternum I (1a) 10–15, 13–14 apart; proximal setae on coxisternum II (2a) 20–25, 31–

32 apart; leg I 38–42, femur 12–13; genu 5–6, antaxial genual seta ( $l'$ ) 35–40; tibia 10–11, paraxial tibial seta ( $l'$ ) 7–9; tarsus 6–7, both seta  $fl'$  and seta  $fl''$  18–20, seta  $u'$  4–5; tarsal empodium ( $em$ ) 5–6, divided, 7 rayed; tarsal solenidion ( $\omega$ ) 6–7, knobbed. Leg II 37–41, femur 12–13; genu 5–6, antaxial genual seta ( $l'$ ) 8–10; tibia 8–9; tarsus 7–8, seta  $fl'$  7–10, seta  $fl''$  18–20, seta  $u'$  4–5; tarsal empodium ( $em$ ) 5–6, divided, 7 rayed; tarsal solenidion ( $\omega$ ) 6–7, knobbed. Opisthosoma dorsally with 52–57 broad annuli; ventrally with 76–83 annuli. Setae  $c$  2 20–25 on ventral annulus 15–16, 56–59 apart; setae  $d$  25–30 on ventral annulus 27–28, 38–40 apart; setae  $e$  12–15 on ventral annulus 46–47, 22–23 apart; setae  $f$  28–30 on 10th ventral annulus from rear, 27–29 apart. Setae  $h1$  minute, 8–9 apart; setae  $h2$  30–45, 10–11 apart. Male genitalia 25–26 wide, setae  $3a$  5–7, 17–19 apart.

Holotype female, from *Lindera glauca* (Sieb. et Zucc.) Bl. (Lauraceae), Jinsi Grand Canyon, Shangnan County (33°31'N, 110°53'E; alt. 780 m), Shaanxi Province, China, 24 July 2008, coll. XIE Man-Chao. Paratypes 7 females and 5 males, same



Figs 3–6. *Diptacus brevichaetus* sp. nov. 3. Ventral view of female. 4. Coxal-genitalia of male. 5. Internal genitalia of female (enlarged). 6. Empodium. Scale bar: 3 = 88  $\mu\text{m}$ , 4 = 75  $\mu\text{m}$ , 6 = 25  $\mu\text{m}$ .

data as holotype.

**Relation to host.** Vagrant on the undersurface of leaves, no obvious damages seen.

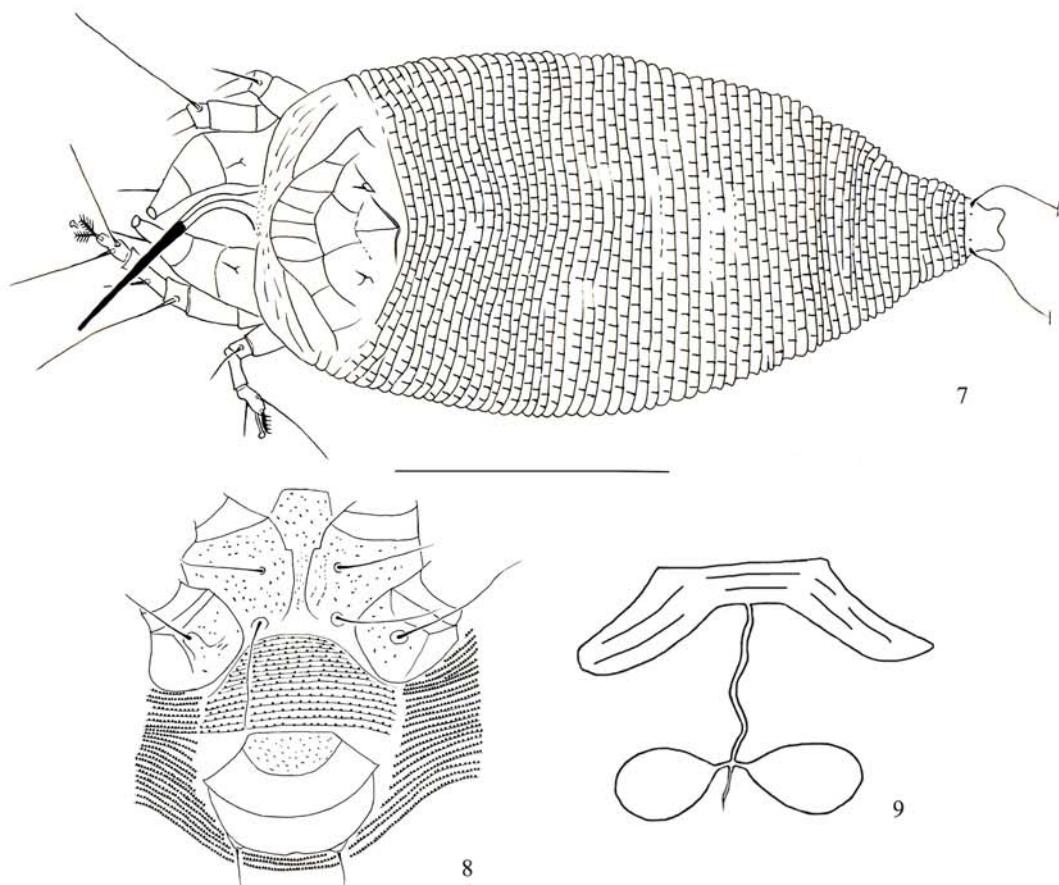
**Etymology.** The specific *brevichaetus* is derived from the characters of scapular setae (*sc*) minute, *brev-* meaning short, *chaet-* meaning seta, *us* as masculine ending.

**Remarks.** This species is similar to *D. actinodaphne* Wang et Wei, 2009, but can be differentiated from the latter by the networks on the front of shield, coxal plates smooth, and female coverflap with basial granules and distal 12 short lines.

#### *Diptacus shangzhous* sp. nov. (Figs 7–12)

**Female** ( $n = 10$ ). Body fusiform, 220 (185–230), 100 (90–100) wide, 100 (95–105) thick; light yellow, yellow and orange in color. Gnathosoma 60 (55–60), chelicerae 60 (55–60), abruptly bent down; pedipalp coxal seta (*ep*) 4 (4–5), dorsal pedipalp genual seta (*d*) 13 (10–13). Prodorsal shield 44 (43–44), 75 (63–75) wide. Shield design with 6–8 networks on the front of shield; median line missing about 1/3 at median, and connected with 2 oblique short lines on rear shield margin; anterior shield lobe present. Scapular tubercles set well ahead of shield margin, 25 (24–26) apart; scapular setae 3 (3–4), projecting forward. Coxal plates I and II

sculptured with granules and few short lines, anterolateral setae on coxisternum I (1*b*) 18 (15–18), 14 (13–15) apart; proximal setae on coxisternum I (1*a*) 21 (21–30), 13 (13–14) apart; proximal setae on coxisternum II (2*a*) 40 (40–45), 40 (37–40) apart; prosternal apodeme present. Legs segments normal, femoral setae absent from both legs; leg I 49 (45–50), femur 15 (14–15); genu 6 (5–7), antaxial genual seta (*l''*) 47 (40–47); tibia 13 (12–13), paraxial tibial seta (*l'*) 10 (10–11), located lateral centrally; tarsus 10 (9–10), both seta *fl'* and seta *fl''* 32 (30–32), seta *u'* 5 (4–5); tarsal empodium (*em*) 5 (5), divided, 5 rayed; tarsal solenidion (*w*) 6 (5–7), knobbed large. Leg II 46 (43–49), femur 15 (14–15); genu 6 (5–7), antaxial genual seta (*l''*) 15 (13–15); tibia 10 (10–12); tarsus 10 (9–10), seta *fl'* 8 (8–10), seta *fl''* 32 (30–32), seta *u'* 5 (4–5); tarsal empodium (*em*) 5 (5), divided, 5 rayed; tarsal solenidion (*w*) 6 (5–7), knobbed large. Opisthosoma dorsally with 59 (57–61) broad annuli, with a weak median longitudinal ridges (about 24–30 dorsal annuli), and ornamented with lines on all dorsal annuli; ventrally with 93–100 annuli, with round microtubercles except caudal 10–11 ventral annuli with elongated microtubercles. Setae *c2* 38 (25–38) on ventral annulus 21–22, 65 (50–65)



Figs 7–9. *Diptacus shangzhou* sp. nov., female. 7. Dorsal view. 8. Coxal-genitalia. 9. Internal genitalia (enlarged). Scale bar: 7–8 = 82  $\mu\text{m}$ .

apart; setae *d* 80 (50–80) on ventral annulus 39–40, 60 (55–60) apart; setae *e* 34 (30–45) on ventral annulus 59–60, 30 (30–31) apart; setae *f* 50 (40–50) on 12<sup>ed</sup> ventral annulus from rear, 33 (33–35) apart. Setae *h* 1 minute, 8 (7–9) apart; setae *h* 2 115 (105–118), 12 (10–12) apart. Female genitalia 25 (25–28), 32 (32–35) wide, coverlap with basial graules and distal smooth, setae 3*a* 8 (8–10), 20 (18–20) apart.

Male ( $n=7$ ). Body fusiform, 170–193, 70–88 wide, 80–88 thick. Gnathosoma 50–53, chelicerae 50–53; pedipalp coxal seta (*ep*) 4–5, dorsal pedipalp genual seta (*d*) 10–13. Prodorsal shield 34–35, 60–65 wide. Scapular tubercles 3–4, 24–25 apart; anterolateral setae on coxisternum I (1*b*) 10–13, 13–14 apart; proximal setae on coxisternum I (1*a*) 10–13, 11–12 apart; proximal setae on coxisternum II (2*a*) 40–50, 35–38 apart; leg I 43–47, femur 14–15; genu 6–7, antaxial genual seta (*I'*) 40–42; tibia 10–11, paraxial tibial seta (*I*) 8–10; tarsus 8–9, both seta *fl*' and seta *fl*'' 28–32, seta *u*' 4–5; tarsal empodium (*em*) 5–6, divided, 5 rayed; tarsal solenidion (*ω*) 5–7, knobbed. Leg II 42–46, femur 14–15; genu 5–6, antaxial genual seta (*I'*) 8–10; tibia 10–11; tarsus 8–9, seta *fl*'' 5–8, seta *fl*'' 28–30, seta *u*' 4–5; tarsal empodium

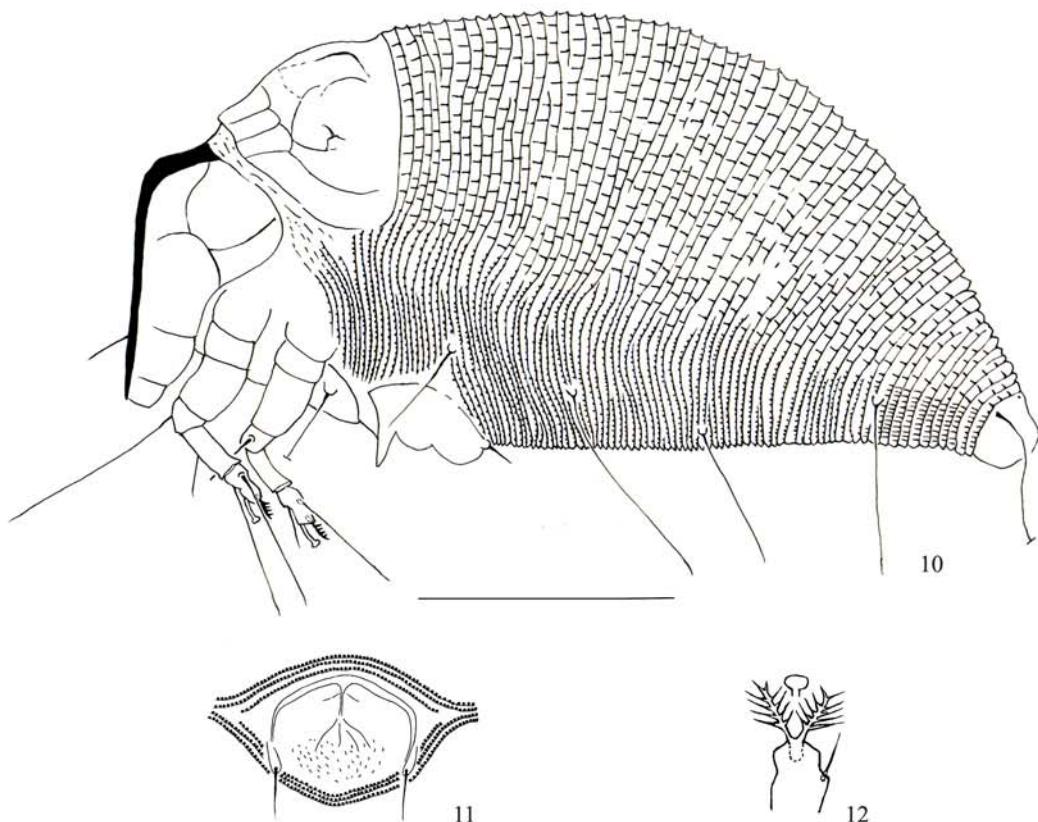
(*em*) 5–6, divided, 5 rayed; tarsal solenidion (*ω*) 5–7, knobbed. Opisthosoma dorsally with 53–56 broad annuli; ventrally with 91–96 annuli. Setae *c* 2 25–30 on ventral annulus 19–20, 60–65 apart; setae *d* 70–75 on ventral annulus 34–35, 44–45 apart; setae *e* 30–50 on ventral annulus 54–55, 28–30 apart; setae *f* 40–50 on 11<sup>st</sup> ventral annulus from rear, 28–30 apart. Setae *h* 1 minute; setae *h* 2 110–118, 10–11 apart. Male genitalia 24–25 wide, setae 3*a* 6–8, 19–20 apart.

Holotype female, from *Cerasus pseudocerasus* (Lindl.) G. Don (Rosaceae), Mt. Qinwang, Shangzhou City (33°47'N, 109°40'E; alt. 870 m), Shaanxi Province, China, 26 Aug. 2008, coll. XIE Man-Chao. Paratypes 9 females and 7 males, same data as holotype.

Relation to host. Vagrant on the undersurface of leaves, no obvious damages seen.

Etymology. The specific *shangzhou* is derived from Shangzhou City where the holotype is collected.

Remarks. This species is similar to *D. pseudocerasis* Kuang et Hong, 1990, and both of them infest on the leaves of cherry tree, but they can be differentiated from each other by following characters: in *D. shangzhou*, anterior shield lobe present, coxal plates sculptured with granules and few lines, prosternal



Figs 10–12. *Diptacus shangzhou* sp. nov. 10. Lateral view of female. 11. Genitalia of male. 12. Empodium.  
Scale bar: 10 = 59  $\mu\text{m}$ , 11 = 43  $\mu\text{m}$ , 12 = 21  $\mu\text{m}$ .

apodeme of coxal plates absent, female coverflap with basal granules and distal smooth. In *D. pseudocerasis*, anterior shield lobe absent, coxal plates smooth, prosternal apodeme of coxal plates present, female coverflap smooth.

## REFERENCES

Amrine, J. W. Jr. and Stasny, T. A. 1994. Catalog of the Eriophyoidea (Acarina: Prostigmata) of the World. Indira Publishing House, Michigan, U. S. A. 798 pp.

Amrine, J. W. Jr., Stasny, T. A. and Flechtmann, C. H. W. 2003. Revised Keys to World Genera of Eriophyoidea (Acaria: Prostigmata). Indira Publishing House, Michigan, U. S. A. 244 pp.

Chen, J-W, Wei, S-G and Qin, A-Z 2003. Four new species of Diptilomiopinae from China (Acari, Diptilomiopidae). *Acta Zootaxonomica Sinica*, 28 (1): 59–65. [动物分类学报]

Chen, J-W, Wei, S-G and Qin, A-Z 2004. A new genus and four new species of eriophyid mites (Acari: Diptilomiopidae) from Guangxi Province of China. *Systematic and Applied Acarology*, 9: 69–75.

Hong, X-Y, Xue, X-F and Song, Z-W 2010. Eriophyoidea of China: a review of progress, with a checklist. *Zoosymposia*, 4: 57–93.

Huang, K-W 2001. The Eriophyoid mites of Taiwan: description of twenty-five species from Walapi. *Bulletin of the National Museum of Natural Science*, 13: 65–93.

Huang, K-W and Wang, C-F 2009. Eriophyoid mites (Acari: Eriophyoidea) of Taiwan: thirty-seven species from Yangmingshan, including one new genus and twenty-two new species. *Zootaxa*, 1986: 1–50.

Huang, T, Hong, Y-J and Huang, W-C 1989. Description of a new species of *Diptacus* of sweet potato from Taiwan. *Chinese Journal of Entomology, Special Publication*, 3: 75–78.

Keifer, H. H. 1951. Eriophyid Studies, 17. *Bulletin of California Department of Agriculture*, 40: 93–103.

Kuang, H-Y 1995. Economic Insect Fauna of China, Fasc. 44, Acari: Eriophyoidea (1). Science Press, Beijing, China. 173–182.

Kuang, H-Y 2001. Two new species of *Diptacus* (Acari: Diptilomiopidae) from China. *Entomotaxonomia*, 23 (2): 153–156.

Kuang, H-Y and Feng, Y-B 1987. Three new species of *Diptacus* Keifer from China (Acariformes, Rhyncaphyoptidae). *Acta Zootaxonomica Sinica*, 12 (1): 50–54. [动物分类学报]

Kuang, H-Y and Hong, X-Y 1990. Two new species of the genus *Diptacus* from China (Acari, Rhyncaphyoptidae). *Acta Zootaxonomica Sinica*, 15 (4): 457–460. [动物分类学报]

Kuang, H-Y and Hong, X-Y 1990. One new genus and three new species of the family Rhyncaphyoptidae (Acari: Eriophyoidea) from the People's Republic of China. *Acarologia*, 31 (4): 367–371.

Kuang, H-Y and Huang, L-W 1991. Two new species of Diptilomiopinae from China (Acariformes: Rhyncaphyoptidae). *Acta Entomologica Sinica*, 34 (2): 238

-240.

Kuang, H-Y, Luo, G-H and Wang, A-W 2005. Fauna of Eriophyid Mites from China ( II ). China Forestry Publishing House, Beijing. 134 - 137.

Liu, M-P and Kuang, H-Y 1998. Three new species of the family Diptilomiopidae from China ( Acari, Eriophyoidea ). *Acta Zootaxonomica Sinica*, 23 ( 1 ) : 25 - 29. [ 动物分类学报 ]

Song, Z-W, Xue, X-F and Hong, X-Y 2007. Description of seven new species in the genus *Diptacus* Keifer ( Acari: Eriophyoidea: Diptilomiopidae: Diptilomiopinae ) from Northwestern China. *Zootaxa*, 1429: 39 - 53.

Wang, G-Q, Wei, S-G and Yang, D 2009. Three new species and a new name in Diptilomiopinae from China ( Acari: Diptilomiopidae ). *Zootaxa*, 2015: 55 - 61.

Wang, Z, Xue, X-F and Hong, X-Y 2009. Four new species and a re-described species of the Diptilomiopinae ( Acari: Eriophyoidea: Diptilomiopidae ) from China. *International Journal of Acarology*, 35 ( 2 ) : 123 - 132.

Wei, S-G, Wang, G-Q and Li, D-W et al. 2009. Eriophyoid Mites of Guangxi, China. Guangxi Science and Technology Press, Nanning. 222 - 232.

Wei, S-G, Wang, G-Q, Li, D-W and Qin, A-Z 2009. Four new species of the genus *Diptacus* Keifer, 1951 from Guangxi, South China ( Acari: Diptilomiopidae ). *International Journal of Acarology*, 35 ( 2 ) : 149 - 159.

Xie, M-C, Wang, R and Hu, L-L 2012. Two new species of eriophyoid mites ( Acari, Eriophyoidea ) on *Chimonanthus praecox* ( Linn. ) Link. from China. *Acta Zootaxonomica Sinica*, 37 ( 1 ) : 93 - 96. [ 动物分类学报 ]

Xin, J-L and Dong, H-Q 1983. Three new species of diptilomiopid mites found in China ( Acarina: Eriophyoidea ). *Acarology*, 24 ( 2 ) : 181 - 185.

Xue, X-F and Hong, X-Y 2005. Five new species of Diptilomiopidae from China ( Acari: Eriophyoidea ). *Zootaxa*, 1055: 49 - 59.

Xue, X-F, Song, Z-W and Hong, X-Y 2006. Four new species of Diptilomiopinae from China ( Acari: Eriophyoidea: Diptilomiopidae ). *Zootaxa*, 1160: 57 - 68.

## 中国陕西双羽爪癟螨属二新种（癟螨总科，羽爪癟螨科，羽爪癟螨亚科）

谢满超

安康学院农学与生命科学学院 安康 725000, E-mail: xiemancho@163.com

**摘要** 记述在陕西发现的双羽爪癟螨属 2 新种：短毛双羽爪癟螨 *Diptacus brevichaetus* sp. nov., 寄主是山胡椒 *Lindera glauca* ( Sieb. et Zucc. ) Bl. ( 樟科 Lauraceae ); 商州双羽爪癟螨 *Diptacus shangzhous* sp. nov., 寄主是樱桃 *Cerasus pseudocerasus* ( Lindl. ) G. Don ( 蔷薇科 Rosaceae )。模式标本保存在安康学院农学与生命科学学院。

**短毛双羽爪癟螨，新种 *Diptacus brevichaetus* sp. nov.** ( 图 1 ~ 6 )

正模♀；副模：7♀♀, 5♂♂, 2008-07-24, 陕西省商南县 ( 33°31'N, 110°53'E; 海拔 780 m ), 金丝峡、谢满超采。寄主为山胡椒 *Lindera glauca* ( Sieb. et Zucc. ) Bl. ( 樟科 Lauraceae )。

新种与黄肉楠双羽爪癟螨 *Diptacus actinodaphne* Wang et Wei, 2009 相似, 但新种背盾板饰有网格; 足 I 基节间光滑; 生殖盖片基部饰有颗粒, 端部饰有 12 短线予以区别 ( 黄肉

**关键词** 癟螨, 新种, 双羽爪癟螨属, 中国。

**中图分类号** Q959.226

楠双羽爪癟螨 *D. actinodaphne* 背盾板饰有不规则短线; 足 I 基节饰有线条; 雌生殖盖片饰有 8 ~ 10 条纵肋 )。

**商州双羽爪癟螨，新种 *Diptacus shangzhous* sp. nov.** ( 图 7 ~ 12 )

正模♀；副模：9♀♀, 7♂♂, 2008-08-26, 陕西省商州市 ( 33°47'N, 109°40'E; 海拔 870 m ), 秦王山、谢满超采。寄主为樱桃 *Cerasus pseudocerasus* ( Lindl. ) G. Don ( 蔷薇科 Rosaceae )。

新种与樱桃双羽爪癟螨 *Diptacus pseudocerasis* Kuang et Hong, 1990 相似, 但新种具前叶突; 足 I 基节分离, 无胸线; 基节饰有颗粒和少量短线; 雌生殖器盖片基部饰有颗粒, 端部光滑予以区别 ( 樱桃双羽爪癟螨 *D. pseudocerasis* 无前叶突; 足 I 基节间具胸线, 基节光滑; 雌生殖器盖片光滑 )。